



United Technologies

PRODUCT SELECTION DATA

AIR-COOLED LIQUID CHILLERS/AIR-TO-WATER HEAT PUMPS DUCTABLE AIR-COOLED LIQUID CHILLERS



Easy and fast installation
Hydraulic module available
Economical operation
Superior reliability

30RB 017-040 A
30RQ 017-040 A
30RBY 017-033 A

AQUASNAP

Nominal cooling capacity 30RB: 16-41 kW
Nominal cooling capacity 30RQ: 16-39 kW
Nominal heating capacity 30RQ: 17-41 kW
Nominal cooling capacity 30RBY: 16-32 kW

The Aquasnap liquid chiller/heat pump range was designed for commercial applications such as the air conditioning of offices and hotels etc.

The new Aquasnap units integrate the latest technological innovations:

- Ozone-friendly refrigerant R410A
- Scroll compressors
- Low-noise fans
- Auto-adaptive microprocessor control

The Aquasnap units are equipped with a hydraulic module integrated into the unit chassis, limiting the installation to straightforward operations like connection of the power supply and the water supply and return piping.



CARRIER participates in the ECP programme for LCP/HP
Check ongoing validity of certificate:
www.eurovent-certification.com

FEATURES

Quiet operation

- Compressors
 - Low-noise scroll compressors with low vibration levels
 - The compressor assembly is supported by anti-vibration mountings
- Air heat exchanger section
 - Vertical air heat exchanger coils
 - The latest-generation low-noise fans are now even quieter and do not generate intrusive low-frequency noise
 - Rigid fan installation for reduced start-up noise.

Access panels, 30RB 017-021



Access panels, 30RBY 017-021



Easy and fast installation

- Integrated hydraulic module
 - Fixed speed circulator
 - Water filter protecting the water pump against circulating debris
 - High-capacity membrane expansion tank ensures pressurisation of the water circuit
 - Overpressure valve, set to 4 bar
 - Automatic purge valve positioned at the highest point of the hydraulic module to remove air from the system.
 - Thermal insulation and frost protection down to -10°C, using an electric resistance heater and pump cycling.
 - Integrated water fill system to ensure correct water pressure (option)
- Physical features
 - With its small footprint the unit blends in with any architectural styles.
 - The unit is enclosed by easily removable panels, covering all components (except air heat exchanger and fans).
- Simplified electrical connections
 - A single power supply point (power supply without neutral available as an option and in standard for units size 40kW)
 - Main disconnect switch with high trip capacity
 - Transformer for safe 24 V control circuit supply included
- Fast commissioning
 - Systematic factory operation test before shipment
 - Quick-test function for step-by-step verification of the instruments, electrical components and motors.
- Easy duct connection (30RBY version only)
 - Rectangular discharge air connection.
 - Fan with 80 Pa available pressure. Centrifugal fan for sizes 017 and 021, and axial fan for sizes 026 and 033.
 - Rectangular suction and filter connection option (sizes 017 and 021 only).

Inlet filters, RBY 017-021



FEATURES

Economical operation

- Increased energy efficiency at part load
 - In accordance with standard EN 14825/2013 in average climate, the Seasonal Coefficient of performance (SCOP) reaches 3.01 for an energy label of A.
 - Specific Free Defrost algorithm is present to optimise performance and comfort even during defrost period.
- Reduced maintenance costs
 - Maintenance-free scroll compressors
 - Fast diagnosis of possible incidents and their history via the Pro-Dialog+ control
 - R410A refrigerant is easier to use than other refrigerant blends

Environmental care

- Ozone-friendly R410A refrigerant
 - Chlorine-free refrigerant of the HFC group with zero ozone depletion potential
 - Very efficient - gives an increased energy efficiency ratio (EER)
- Leak-tight refrigerant circuit
 - Brazed refrigerant connections for increased leak-tightness
 - Verification of pressure transducers and temperature sensors without transferring refrigerant charge

Hydraulic module, sizes 026-040



Superior reliability

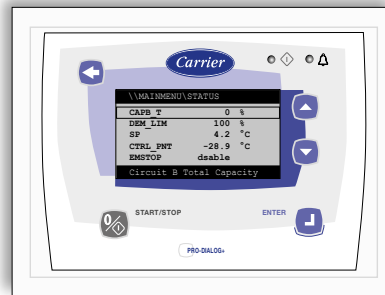
- State-of-the-art concept
 - Cooperation with specialist laboratories and use of limit simulation tools (finite element calculations) for the design of the critical components, e.g. motor supports, suction/discharge piping etc.
- Auto-adaptive control
 - Control algorithm prevents excessive compressor cycling and permits reduction of the water quantity in the hydraulic circuit (Carrier patent)

- Exceptional endurance tests
 - Corrosion resistance tests in salt mist in the laboratory
 - Accelerated ageing test on components that are submitted to continuous operation: compressor piping, fan supports
 - Transport simulation test in the laboratory on a vibrating table.

Pro-Dialog+ control

Pro-Dialog+ combines intelligence with operating simplicity. The control constantly monitors all machine parameters and precisely manages the operation of compressors, expansion devices, fans and of the water heat exchanger water pump for optimum energy efficiency.

Pro-Dialog+ interface



- Energy management
 - Seven-day internal time schedule clock: Permits unit on/off control and operation at a second set point
 - Set point reset based on the outside air temperature or the return water temperature or on the water heat exchanger delta T
 - Master/slave control of two units operating in parallel with operating time equalisation and automatic change-over in case of a unit fault.
 - Change-over based on the outside air temperature
- Integrated features
 - Night mode: Capacity and fan speed limitation for reduced noise level
- Ease-of-use
 - The new backlit LCD interface includes a manual control potentiometer to ensure legibility under any lighting conditions.
 - The information is displayed clearly in English, French, German, Italian and Spanish (for other languages please consult Carrier)
 - The Pro-Dialog+ navigation uses intuitive tree-structure menus, similar to the Internet navigators. They are user-friendly and permit quick access to the principal operating parameters: number of compressors operating, suction/discharge pressure, compressor operating hours, set point, air temperature, entering/leaving water temperature.

FEATURES

Remote operating mode with volt-free contacts (standard)

A simple two-wire communication bus between the RS485 port of the Aquasnap and the Carrier Comfort Network offers multiple remote control, monitoring and diagnostic possibilities. Carrier offers a vast choice of control products, specially designed to control, manage and supervise the operation of an air conditioning system. Please consult your Carrier representative for more information on these products.

- Start/stop: Opening of this contact will shut down the unit
- Dual set point: Closing of this contact activates a second set point (example: Unoccupied mode)
- Alert indication: This volt-free contact indicates the presence of a minor fault
- Alarm indication: This volt-free contact indicates the presence of a major fault that has led to the shut-down of the unit
- User safety: This contact can be used for any customer safety loop, closing of the contact generates a specific alarm
- Out of service: This signal indicates that the unit is completely out of service
- Unit capacity: This analogue output (0-10 V) gives an immediate indication of the unit capacity
- Compressor operation: This contact signals that the compressor is in operation

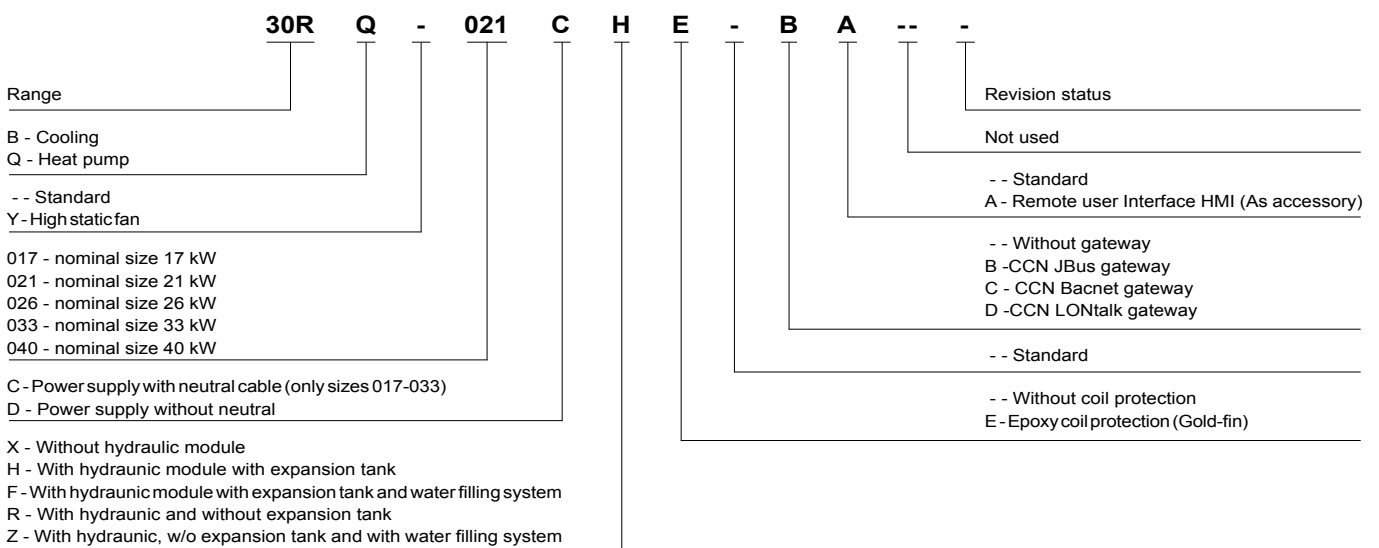
Remote interface (option)

This interface allows access to the same menus as the unit interface and can be installed up to 300 m away. It includes a box that can be mounted inside the building. The power supply is provided via a 220 V/24V transformer supplied.

Interface access, sizes 026-040



TYPE KEY



HYDRAULIC MODULE

The hydraulic module reduces the installation time. The unit is factory-equipped with the main hydraulic components required for the installation: screen filter, variable speed circulator, expansion tank and relief valve.

The water heat exchanger and the hydraulic module are

protected against frost down to -10°C, using an electric resistance heater (standard) and pump cycling.

The hydraulic module is integrated into the unit without increasing its dimensions and saves the space normally used for the water pump.

Physical and electrical data

These are the same as for the standard unit except:

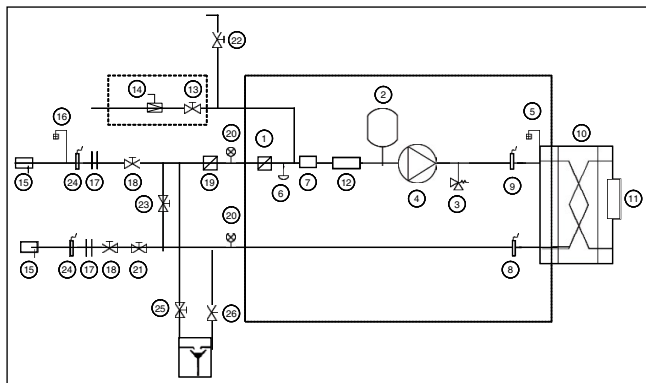
30RB/RQ and 30RBY** units with hydraulic module	017	021	026	033	040	
Hydraulic module						
Expansion tank volume	l	5	5	8	8	8
Maximum water-side operating pressure	kPa	400	400	400	400	400
Pumps						
Water pump	Pump, screen filter, expansion tank, flow switch, automatic purge valve, relief valve					
Power input*	kW	0.54	0.59	0.99	1.10	1.20
Nominal operating current draw*	A	1.30	1.40	2.40	2.60	2.80

* Nominal conditions: evaporator entering/leaving water temperature 12°C/7°C, outside air temperature 35°C, evaporator fouling factor = 0 m² K/kW.
Gross performances, not in accordance with EN14511-3:2013. These performances do not take into account the correction for the proportional heating capacity and power input generated by the water pump to overcome the internal pressure drop in the heat exchanger.

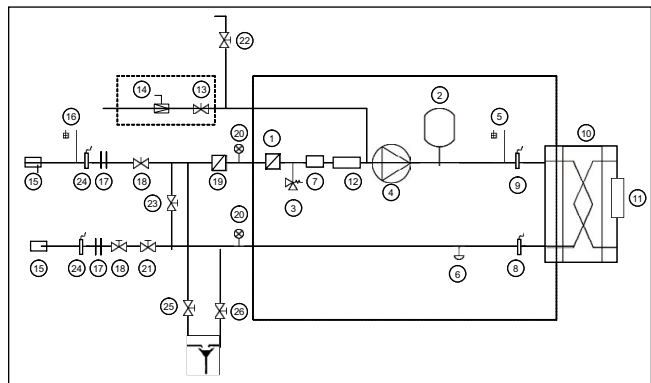
** Only 30RBY 017-033

Typical hydraulic circuit diagram

17-21 kW



26-40 kW



Hydraulic module (unit with hydraulic module)
Automatic water fill system option

Legend

Components of the unit and hydraulic module

1. Screen filter
2. Expansion tank
3. Relief valve
4. High-pressure pump
5. Air purge
6. Water drain valve
7. Flow sensor
8. Plate heat exchanger leaving temperature sensor
9. Plate heat exchanger entering temperature sensor
10. Plate heat exchanger
11. Heat exchanger frost protection heater
12. Pipe frost protection heater
13. Shut-off valve (automatic water fill option)
14. Pressure reducer (automatic water fill option)

System components

15. Temperature sensor well
16. Air purge
17. Flexible connections
18. Shut-off valve
19. Screen filter (obligatory for a unit without hydraulic module)
20. Pressure gauge
21. Flow control valve (factory-supplied for field installation)
22. Charge valve
23. Frost protection bypass (when shut-off valves are closed in winter)
24. Pressure sensor
25. System drain valves
26. Plate heat exchanger drain valve

PHYSICAL DATA, 30RB UNITS

30RB		017	021	026	033	040		
Cooling								
Standard unit	Nominal capacity	kW	16,4	21,4	27,3	33,3	41,4	
	Full load performances* CA1	EER	kW/kW	3,04	3,11	3,08	3,28	2,96
		Eurovent class		B	A	B	A	B
CA2	Nominal capacity	kW	22,7	29,5	38,6	45,8	56,9	
	EER	kW/kW	3,80	3,86	4,01	4,11	3,52	
	Eurovent class		A	A	A	A	C	
Standard unit	SEPR_{-2/-8°C} Process medium temp.***	kWh/kWh	2,99	3,03	3,16	3,02	3,07	
Seasonal energy efficiency**	SEPR _{12/7°C} Process high temp.	kWh/kWh	5,29	5,28	5,13	5,16	5,13	
	SEER _{12/7°C} Comfort low temp.	kWh/kWh	3,37	3,37	3,30	3,51	3,44	
	SEER _{23/18°C} Comfort medium temp.	kWh/kWh	3,99	3,92	3,92	4,04	3,95	
Integrated Part Load Value	IPLV.SI	kW/kW	4,350	4,340	4,340	4,540	4,030	
Operating weight⁽¹⁾								
Standard unit, with hydraulic module		kg	189	208	255	280	291	
Standard unit, without hydraulic module		kg	173	93	237	262	273	
Sound power level⁽²⁾		dB(A)	72	74	78	78	80	
Sound pressure level at 10 m ⁽³⁾		dB(A)	40	42	46	46	48	
Dimensions								
Length		mm	1136		1002			
Depth		mm	584		824			
Height		mm	1579		1790			
Compressor		One hermetic scroll compressor						
Refrigerant charge R-410A		kg	5,5	6,4	5,8	8,6	8,8	
		teqCO ₂	11,5	13,4	12,1	18,0	18,4	
Control		Pro-Dialog+						
Fans		Two twin-speed axial fans, 3 blades		One twin-speed axial fan, 7 blades				
Diameter		mm	495	495	710	710	710	
Air flow		l/s	2212	2212	3530	3530	3530	
Speed		r/s	14,5	14,5	15	15	15	
Water heat exchanger		Plate heat exchanger, maximum operating pressure 1000 kPa						
Water volume		l	1,52	1,9	2,28	2,85	3,8	
Air heat exchanger		Copper tubes and aluminum fins						
Pipe diameter		in	3/8	3/8	3/8	3/8	3/8	
Number of rows			2	2	2	3	3	
Number of pipes per row			60	60	60	60	60	
Fin spacing		mm	1,69	1,69	1,69	1,69	1,69	

- * In accordance with standard EN14511-3:2013
 ** In accordance with standard EN14825:2016, average climate
 *** With EG 30%
 CA1 Cooling mode conditions: Evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, evaporator fooling factor 0 m².K/W
 CA2 Cooling mode conditions: Evaporator water entering/leaving temperature 23°C/18°C, outside air temperature 35°C, evaporator fooling factor 0 m².K/W
SEPR_{-2/-8°C} **Bold values compliant to Ecodesign regulation: (EU) No 2015/1095 for Process application**
SEER_{12/7°C} & SEPR_{12/7°C} Values calculated in accordance with EN14825:2016
SEER_{23/18°C} Values calculated in accordance with EN14825:2016
 IPLV.SI Calculations according to standard performances AHRI 551-591 (SI)
 (1) Weight shown is a guideline only. Please refer to the unit nameplate
 (2) In dB ref=10⁻¹² W, (A) weighting. Declared dualnumber noise emission values in accordance with ISO 4871 (with an associated uncertainty of +/-3dB(A)). Measured in accordance with ISO 9614-1 and certified by Eurovent.
 (3) In dB ref 20µPa, (A) weighting. Declared dualnumber noise emission values in accordance with ISO 4871 (with an associated uncertainty of +/-3dB(A)). For information, calculated from the sound power level Lw(A).



Eurovent certified values

PHYSICAL DATA, 30RB UNITS

30RB		017	021	026	033	040
Standard unit						
Water connections (MPT gas)	in	1	1	1-1/4	1-1/4	1-1/4
Unit with hydraulic module		Pump, screen filter, expansion tank, flow switch, pressure gauge, automatic air purge valve, relief valve				
Pump		One single-speed pump, maximum water-side operating pressure 400 kPa				
Expansion tank capacity	l	5	5	8	8	8
Entering water connection	in	1-1/4	1-1/4	1-1/4	1-1/4	1-1/4
Leaving water connection	in	1	1	1-1/4	1-1/4	1-1/4
Nominal operating current	A	1,3	1,4	2,4	2,6	2,8
Chassis paint colour		Beige				

PHYSICAL DATA, 30RQ UNITS

30RQ			017	021	026	033	040	
Heating								
Standard unit Full load performances*	HA1	Nominal capacity	kW	17,6	22,0	30,8	34,3	38,6
		COP	kW/kW	4,03	3,98	3,98	3,98	3,52
	HA2	Nominal capacity	kW	17,0	21,5	29,6	33,0	40,7
		COP	kW/kW	3,21	3,28	3,21	3,19	3,16
Standard unit Seasonal energy efficiency**	HA1	SCOP _{30/35°C}	kW/kW	3,23	3,20	3,26	3,27	3,25
		ηs heat _{30/35°C}	%	126	125	127	128	127
		P _{rated}	kW	13	13	21	23	31
		Energy labelling		A+	A+	A+	A+	A+
Cooling								
Standard unit Full load performances*	CA1	Nominal capacity	kW	15,8	19,9	26,3	32,3	39,2
		EER	kW/kW	3,10	3,03	2,94	3,14	2,85
		Eurovent class		A	B	B	A	C
	CA2	Nominal capacity	kW	21,9	26,9	34,0	42,9	54,2
		EER	kW/kW	3,93	3,68	3,56	3,88	3,44
		Eurovent class		A	B	C	A	D
Standard unit Seasonal energy efficiency**	SEER _{12/7°C} Comfort low temp.	kWh/kWh	3,42	3,28	3,25	3,45	3,32	
	SEER _{23/18°C} Comfort medium temp.	kWh/kWh	4,08	3,78	3,74	3,96	3,85	
	SEPR _{12/7°C} Process high temp.	kWh/kWh	5,43	5,20	4,95	5,10	3,94	
Integrated Part Load Value	IPLV.SI	kW/kW	4,400	4,172	4,068	4,352	3,846	
Operating weight⁽¹⁾								
Standard unit, with hydraulic module		kg	206	223	280	295	305	
Standard unit, without hydraulic module		kg	191	208	262	277	287	
Sound power level⁽²⁾		dB(A)	72	74	78	78	80	
Sound pressure level at 10 m ⁽³⁾		dB(A)	40	42	46	46	48	
Dimensions								
Length		mm	1136		1002			
Depth		mm	584		824			
Height		mm	1579		1790			
Compressor			One hermetic scroll compressor					
Refrigerant charge R-410A		kg	6,4	7,7	7,6	9,5	9,8	
		teqCO ₂	13,4	16,1	15,9	19,8	20,5	
Control			Pro-Dialog+					

- * In accordance with standard EN14511-3:2013
- ** In accordance with standard EN14825:2016, average climate
- HA1 Heating mode conditions: Water heat exchanger water entering/leaving temperature 30°C/35°C, outside air temperature tdb/twb = 7°C db/6°C wb, evaporator fooling factor 0 m².K/W
- HA2 Heating mode conditions: Water heat exchanger water entering/leaving temperature 40°C/45°C, outside air temperature tdb/twb= 7°C db/6°C wb, evaporator fooling factor 0 m².K/W
- CA1 Cooling mode conditions: evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, evaporator fooling factor 0 m².K/W
- CA2 Cooling mode conditions: evaporator water entering/leaving temperature 23°C/18°C, outside air temperature 35°C, evaporator fooling factor 0 m².K/W
- ηs heat_{30/35°C} & SCOP_{30/35°C}** **Bold values compliant to Ecodesign regulation: (EU) No 813/2013 for Heat Pump application**
SEER_{12/7°C} & SEPR_{12/7°C} Values calculated in accordance with EN14825:2016
SEER_{23/18°C} Values calculated in accordance with EN14825:2016
IPLV.SI Calculations according to standard performances AHRI 551-591 (SI)
(1) Weight shown is a guideline only. Please refer to the unit nameplate
(2) In dB ref=10⁻¹² W, (A) weighting. Declared dualnumber noise emission values in accordance with ISO 4871 (with an associated uncertainty of +/-3dB(A)). Measured in accordance with ISO 9614-1 and certified by Eurovent.
(3) In dB ref 20μPa, (A) weighting. Declared dualnumber noise emission values in accordance with ISO 4871 (with an associated uncertainty of +/-3dB(A)). For information, calculated from the sound power level Lw(A).



Eurovent certified values

PHYSICAL DATA, 30RQ UNITS

30RQ		017	021	026	033	040
Fans		Two twin-speed axial fans, 3 blades		One twin-speed axial fan, 7 blades		
Diameter	mm	495	495	710	710	710
Air flow	l/s	2217	1978	3530	3530	3530
Speed	r/s	14,5	14,5	15	15	15
Water heat exchanger		Plate heat exchanger, maximum operating pressure 1000 kPa				
Water volume	l	1,52	1,9	2,28	2,85	3,8
Air heat exchanger		Copper tubes and aluminum fins				
Pipe diameter	in	3/8	3/8	3/8	3/8	3/8
Number of rows		2,5	3	2,5	3	3
Number of pipes per row		60	60	60	60	60
Fin spacing	mm	1,69	1,69	1,69	1,69	1,69
Standard unit						
Water connections (MPT gas)	in	1	1	1-1/4	1-1/4	1-1/4
Unit with hydraulic module		Pump, screen filter, expansion tank, flow switch, pressure gauge, automatic air purge valve, relief valve				
Pump		One single-speed pump, maximum water-side operating pressure 400 kPa				
Expansion tank capacity	l	5	5	8	8	8
Entering water connection	in	1-1/4	1-1/4	1-1/4	1-1/4	1-1/4
Leaving water connection	in	1	1	1-1/4	1-1/4	1-1/4
Nominal operating current	A	1,3	1,4	2,4	2,6	2,8
Chassis paint colour		Beige				

PHYSICAL DATA, 30RBY UNITS

30RBY		017	021	026	033	
Cooling						
Standard unit	Nominal capacity	kW	15,7	20,3	27,0	32,3
Full load performances* CA1	EER	kW/kW	2,65	2,60	2,88	3,05
	Eurovent class		B	B	A	A
	Nominal capacity	kW	19,9	24,8	36,1	42,3
CA2	EER	kW/kW	3,07	2,85	3,49	3,67
	Eurovent class		E	E	D	B
	Standard unit	SEPR_{-2/-8°C} Process medium temp.***	kWh/kWh	2,61	2,64	2,62
Seasonal energy efficiency**	SEPR _{12/7°C} Process high temp.	kWh/kWh	4,17	4,03	4,29	4,06
	SEER _{12/7°C} Comfort low temp.	kWh/kWh	2,76	2,72	2,86	3,08
	SEER _{23/18°C} Comfort medium temp.	kWh/kWh	3,10	3,05	3,28	3,52
Integrated Part Load Value	IPLV.SI	kW/kW	3,340	3,300	3,490	3,690
Operating weight⁽¹⁾						
Standard unit, with hydraulic module		kg	209	228	255	280
Standard unit, without hydraulic module		kg	193	213	237	262
Sound pressure level⁽²⁾		dB(A)	50	50	53	53
Sound power level radiated from the unit⁽³⁾		dB(A)	82	82	85	85
Sound power level at unit discharge ⁽³⁾		dB(A)	80	80	91	91
Dimensions						
Length		mm	1135	1135	1002	1002
Depth		mm	584	584	824	824
Height		mm	1608	1608	1829	1829
Compressor		One hermetic scroll compressor				
Refrigerant charge R-410A	kg	5,5	6,4	5,8	8,6	
	teqCO ₂	11,5	13,4	12,1	18,0	
Control		Pro-Dialog+				
Fans		Two 2-speed centrifugal fans, 5 backward-curved		One 2-speed axial fan, 7 blades		
Diameter		mm	454	454	630	630
Number of blades			5	5	7	7
Available static pressure		Pa	80	80	80	80
Air flow		l/s	1640	1640	3472	3472
Speed		r/s	20,5	20,5	21,5	21,5
Water heat exchanger		One plate heat exchanger				
Water volume		l	1,52	1,90	2,28	2,85
Maximum operating pressure		kPa	1000	1000	1000	1000

- * In accordance with standard EN14511-3:2013
 ** In accordance with standard EN14825:2016, average climate
 *** With EG 30%
 CA1 Cooling mode conditions: Evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, evaporator fooling factor 0 m².K/W
 CA2 Cooling mode conditions: Evaporator water entering/leaving temperature 23°C/18°C, outside air temperature 35°C, evaporator fooling factor 0 m².K/W
SEPR_{-2/-8°C} **SEPR_{12/7°C}** **SEER_{12/7°C}** & **SEPR_{12/7°C}**
SEER_{23/18°C}
 IPLV.SI
Bold values compliant to Ecodesign regulation: (EU) No 2015/1095 for Process application
 Values calculated in accordance with EN14825:2016
 Values calculated in accordance with EN14825:2016
 Calculations according to standard performances AHRI 551-591 (SI)
 (1) Weight shown is a guideline only. Please refer to the unit nameplate
 (2) For information, calculated from the sound power level Lw(A)
 (3) In accordance with ISO 9614 (10⁻¹² W)



Eurovent certified values

PHYSICAL DATA, 30RBY UNITS

30RBY		017	021	026	033
Air heat exchanger		Copper tubes and aluminum fins			
Pipe diameter	in	3/8	3/8	3/8	3/8
Number of rows		2	2	2	3
Number of pipes per row		60	60	60	60
Fin spacing	mm	1,69	1,69	1,69	1,69
Standard unit					
Water connections (MPT gas)	in	1	1	1-1/4	1-1/4
Unit with hydraulic module		Pump, screen filter, expansion tank, flow switch, pressure gauge, automatic air purge valve, relief valve, water circuit drain valve			
Pump		One single-speed pump, maximum water-side operating pressure 400 kPa			
Expansion tank capacity	l	5	5	8	8
Entering water connection	in	1-1/4	1-1/4	1-1/4	1-1/4
Leaving water connection	in	1	1	1-1/4	1-1/4
Chassis paint colour		Colour code: RAL 7035			

ELECTRICAL DATA, 30RB/RQ UNITS

30RB/RQ		017	021	026	033	040
Power circuit						
Nominal power supply	V-ph-Hz	400-3+N-50 (power supply option C) or 400-3-50 (power supply option D)				400-3-50 (STD - no option)
Voltage range	V	340-460				360-440
Control circuit supply		24 V via internal transformer				
Maximum start-up current (Un)*	A	75	95	118	118	176
Unit power factor at nominal capacity**		0.84	0.79	0.77	0.81	0.9
Maximum operating power input**	kW	7.8	9.1	11	13.8	17.5
Nominal current drawn***	A	8	12	16	17	25
Maximum operating current draw (Un)****	A	13	16	20	24	30
Maximum operating current draw (Un-15%)†	A	15	18	23	27	36

* Maximum instantaneous start-up current (locked rotor current of the compressor).

** Power input, compressors and fans, at the unit operating limits (saturated suction temperature 10°C, saturated condensing temperature 65°C) and nominal voltage of 400 V (data given on the unit nameplate).

*** Standardised Eurovent conditions: Water heat exchanger entering/leaving water temperature 12°C/7°C, outside air temperature 35°C.

**** Maximum unit operating current at maximum unit power input and 400 V (values given on the unit nameplate).

† Maximum unit operating current at maximum unit power input and 340-460V for sizes 017 to 033 or 360-440V for size 040.

PART LOAD PERFORMANCES

SEER for comfort chillers (in accordance with EU ECODESIGN)

The **SEER (Seasonal Energy Efficiency Ratio)** measures the seasonal energy efficiency of comfort **chillers** by calculating the ratio between annual cooling demand of the building and annual energy demand of the chiller. It takes into account the energy efficiency achieved for each outdoor temperature weighted by the number of hours observed for each of these temperatures, using actual climate data.

SEER is a new way of measuring the true energy efficiency of chillers for **comfort cooling** over an entire year. This new indicator gives a more realistic indication of the real energy efficiency and environmental impact of a cooling system (Ecodesign Regulation 2016/2281).

SCOP (In accordance with standard N14825:2013, average climate)

The **SCOP (Seasonal Coefficient of Performance)** permit evaluation of the average energy efficiency at part load, based on multipoint conditions (16°C to -10°C for average climate) and number of hours occurring at each air temperature (Bin hours).

To be able to compare the energy efficiency of boilers using a primary energy source (gas or fuel) with heat pumps using a final energy source (electricity), the seasonal efficiency criteria used by the Ecodesign regulations is known as it is based on the use of primary energy sources and expressed in %.

SEPR for process chillers (in accordance with EU ECODESIGN)

The **SEPR (Seasonal Energy Performance Ratio)** measures the seasonal energy efficiency of **process chillers** by calculating the ratio between annual cooling demand of the process and annual energy demand of the chiller. It takes into account the energy efficiency achieved at each outdoor temperature of an average climate weighted by the number of hours observed for each of these temperatures.

SEPR is a new way of measuring the true energy efficiency of chillers for **process cooling** over an entire year. This new indicator gives a more realistic indication of the real energy efficiency and environmental impact of the cooling system (Ecodesign Regulation 2015/1095).

NEW ENERGY EFFICIENCY METRIC: SCOP

Because buildings have a thermal load depending on outdoor air temperature

The Seasonal Coefficient of Performance (SCOP) is a new European parameter to evaluate the energy efficiency of heat pumps. It replaces the Coefficient of Performance (COP), which measured the ratio of power consumed to power produced in the heating mode on a single operating point.

Unlike its predecessor, the SCOP is representative of operation during the heating season as it includes seasonal variations by defining several realistic measurement points. Together, these contribute to classification in the correct energy efficiency class.

SCOP versus COP efficiency (for heat pumps)

TEMPERATURE		CAPACITY (KW)		AUXILIARY MODES (KWH)		HOURS	
COP	SCOP	COP	SCOP	COP	SCOP	COP	SCOP
1 temperature condition: 7°C	Several rating temperatures: -10°C to 16°C (average climate)	Full load	Partial load + Full load	No auxiliary power modes taken into consideration	Includes consumption auxiliary modes: - Standby mode - Off mode - Thermostat off...	N/A	Number of hours occurring at each air temperature (bin hours)

SCOP Calculation

SCOP is the ratio between annual heating demand and annual energy input over an entire heating season.

$$SCOP = \frac{\text{ANNUAL HEATING DEMAND}}{\text{ANNUAL ENERGY INPUT*}}$$

- * Annual energy input:
- Compressor running (SCOPon)
- Compressor not running: thermostat OFF, standby, OFF mode & crankcase heater
- Backup heater to supplement heat pump capacity

ηs: seasonal primary energy efficiency metrics:

In order to compare the energy efficiency of products using different sources of energy, such as boilers (gas, fuel) and electric heat pumps, the Ecodesign regulation introduces a new measurement expressed in primary energy: ηs (eta s).

$$\eta_s = SCOP/2.5^* \times 100 - i^{**}$$

Primary energy



Primary energy



Electricity



In Europe, on average, 2.5 kW*** of primary energy is required to generate 1 kW of electricity.

- ** Air source heat pump i = 3
- Water source heat pump: i = 8
- *** Source: EU Regulation 813/2013
- *** Source: EU Regulation 813/2013

SOUND SPECTRUM

30RB/RQ units

30RB/RQ		Octave bands, Hz						Sound power levels	
		125	250	500	1000	2000	4000		
017	dB	75	72	70	67	61	60	dB(A)	72
021	dB	80	75	70	69	63	60	dB(A)	74
026	dB	79	76	76	74	67	60	dB(A)	78
033	dB	79	76	76	74	67	60	dB(A)	78
040	dB	82	79	77	76	71	65	dB(A)	80

30RBY units

30RBY			Octave bands, Hz						Sound power levels		
			125	250	500	1000	2000	4000			8000
017	Radiated	dB	95	80	78	73	71	69	65	dB(A)	82
021		dB	95	80	78	73	71	69	65	dB(A)	82
026		dB	95	84	80	79	78	72	68	dB(A)	85
033		dB	95	84	80	79	78	72	68	dB(A)	85
017	Fan outlet	dB	88	79	77	74	71	68	65	dB(A)	80
021		dB	88	79	77	74	71	68	65	dB(A)	80
026		dB	91	85	84	87	86	78	71	dB(A)	91
033		dB	91	85	84	87	86	78	71	dB(A)	91

OPERATING LIMITS

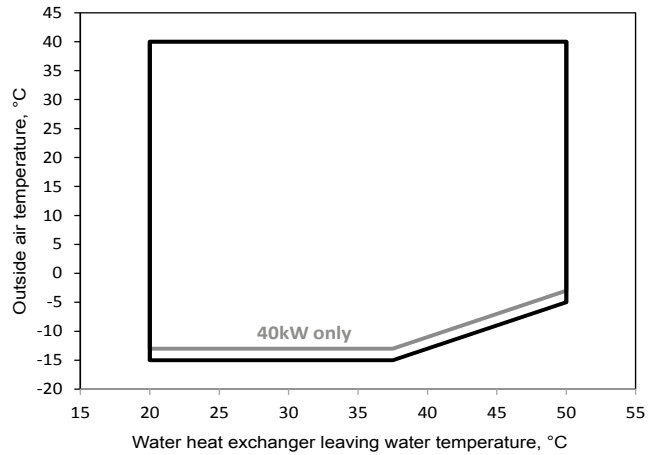
Water heat exchanger water flow rate

30RB/RBY ⁽¹⁾	Minimum flow rate	Maximum flow rate ⁽²⁾	Maximum flow rate ⁽³⁾
	l/s	l/s	l/s
17	0,4	1,39	1,26
21	0,47	1,52	1,42
26	0,63	1,96	1,43
33	0,82	2,18	1,72
40	0,99	2,6	2,7

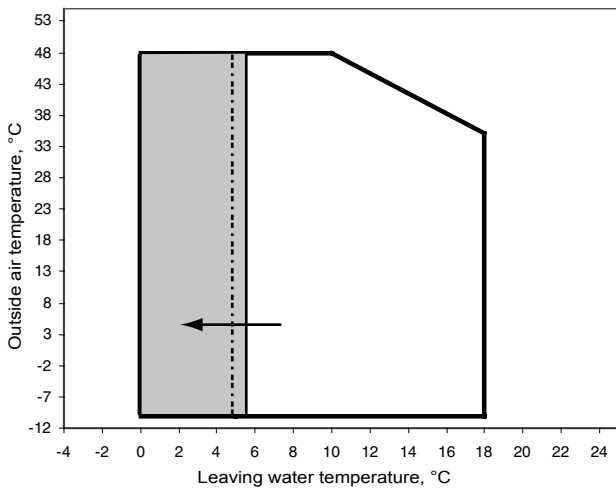
30RQ	Minimum flow rate	Maximum flow rate ⁽²⁾	Maximum flow rate ⁽³⁾
	l/s	l/s	l/s
17	0,45	1,39	1,26
21	0,57	1,52	1,42
26	0,67	2,18	1,72
33	0,87	2,29	1,85
40	1,05	2,6	2,7

- * Only 30RBY 017-033
- ** Maximum flow rate at an available pressure of 50 kPa (unit with hydraulic module)
- *** Maximum flow rate at pressure drop of 100 kPa in the plate heat exchanger (unit without hydraulic module).

30RQ (heating mode)

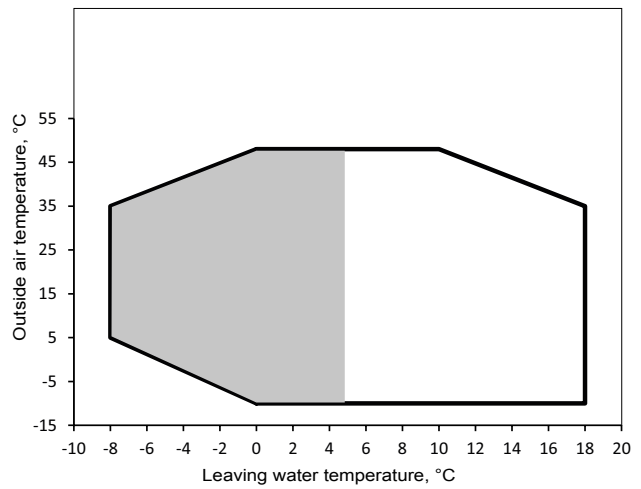


30RQ (cooling mode)



Operating range with anti-freeze solution and Pro-Dialog configuration.

30RB/RBY (cooling mode)



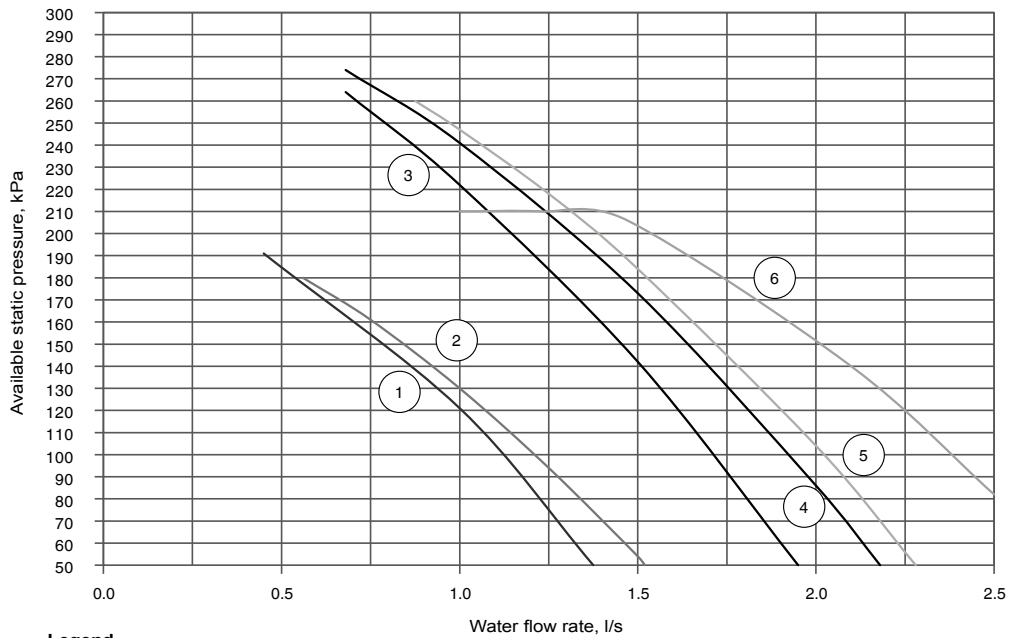
Operating range with anti-freeze solution and Pro-Dialog configuration.

AVAILABLE STATIC SYSTEM PRESSURE

Data applicable for:

- Fresh water 20 °C
- In case of use of the glycol, the maximum water flow is reduced.

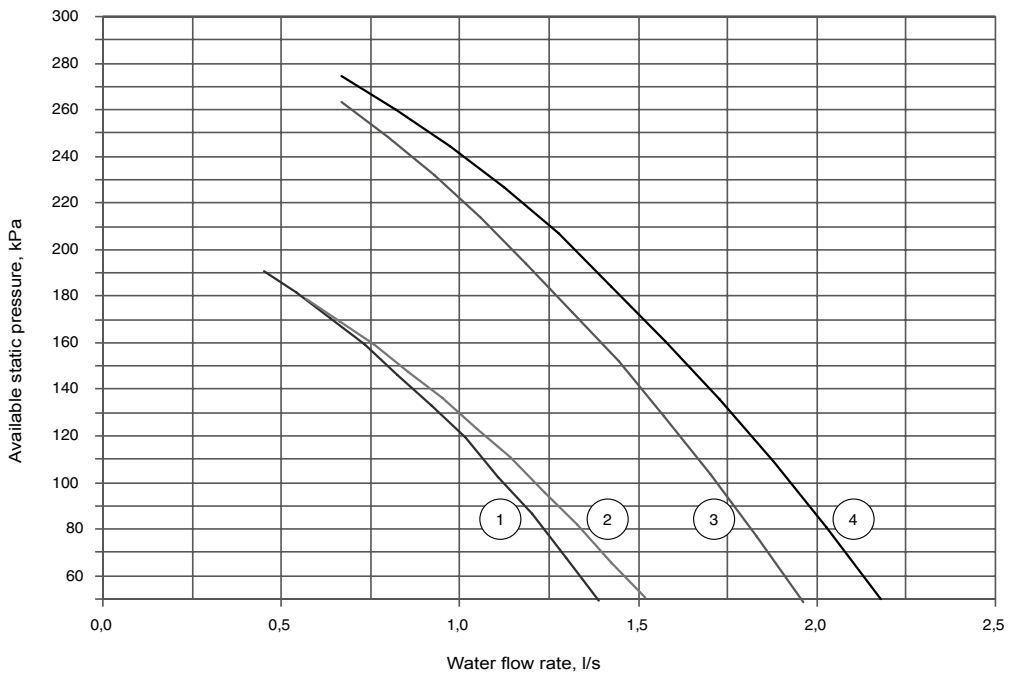
30RB/RQ 017-040



Legend

1. 30RB/RQ 017
2. 30RB/RQ 021
3. 30RB 026
4. 30RB 033 - 30RQ 026
5. 30RQ 033
6. 30RB/RQ 040

30RBY 017-033



Legend

1. 30RBY 017
2. 30RBY 021
3. 30RBY 026
4. 30RBY 033

AIR PRESSURE DROP

Ducted unit selection

The selection is based on the pressure drop:

The cooling and heating capacities are given for an available pressure of 80 Pa and for a unit without filter.

To calculate the performances at lower pressure drops please use the correction factors below.

Cooling mode

Air duct conditions, 30RBY 017-021				
Duct pressure drop, Pa	Air flow factor	Cooling capacity factor	EER factor	Power input factor
0	1.129	1.053	1.087	0.962
20	1.097	1.047	1.076	0.966
40	1.064	1.034	1.050	0.979
60	1.032	1.021	1.022	0.990
80	1.000	1.000	1.000	1.000

Air duct conditions, 30RBY 026-033				
Duct pressure drop, Pa	Air flow factor	Cooling capacity factor	EER factor	Power input factor
0	1.200	1.042	1.075	0.971
20	1.150	1.033	1.065	0.974
40	1.100	1.021	1.043	0.981
60	1.049	1.010	1.022	0.990
80	1.000	1.000	1.000	1.000

Filter option

30RBY		017	021
Filter pressure drop			
Clean filter	Pa	10	10
Clogged filter	Pa	20	20

VARIABLE WATER FLOW SYSTEM (VWF)

Variable water flow is a hydraulic control function package that permits control of the water flow rate.

The VWF not only ensures control at full load, a specific Carrier algorithm linked to an electronic frequency converter also continuously modulates the flow rate to minimise pump consumption at full load as well as part load.

The hydraulic module includes pressure transducers that permit intelligent measurement of the water flow rate and real-time display on the Pro-Dialog+ interface. All adjustments can be made directly on the interface, speeding up start-up and maintenance.

As VWF acts directly on the pump, the system no longer requires the control valve at the unit outlet. However, for applications with two-way valves a bypass system must be kept to guarantee the minimum flow rate.

Operating logic

- Full-load set point

The flow rate control at full load uses the Pro-Dialog+ interface, reducing the pump speed. This first control saves energy that would normally be dissipated in the control valve. For example, if the pressure supplied by the pump is reduced by 20% the power consumption of the pump is reduced by the same ratio, compared to a traditional installation.

- Operating mode at part load

Pro-Dialog+ includes two part-load operating modes:

- Constant outlet pressure control
- Constant delta T control.

1 – Constant unit outlet pressure control

The control continuously acts on the pump speed to ensure a constant outlet pressure.

This solution is suitable for installations with two-way valves. When these close, the water speed will accelerate in the system branches that are still open. For a fixed-speed pump this results in an unnecessary increase of the pressure at the pump outlet.

The outlet pressure control mode ensures that each circuit branch always has a uniform supply, without unnecessary energy waste.

In industrial processes such as plastic injection moulding, this solution ensures that each terminal unit has the correct pressure supply.

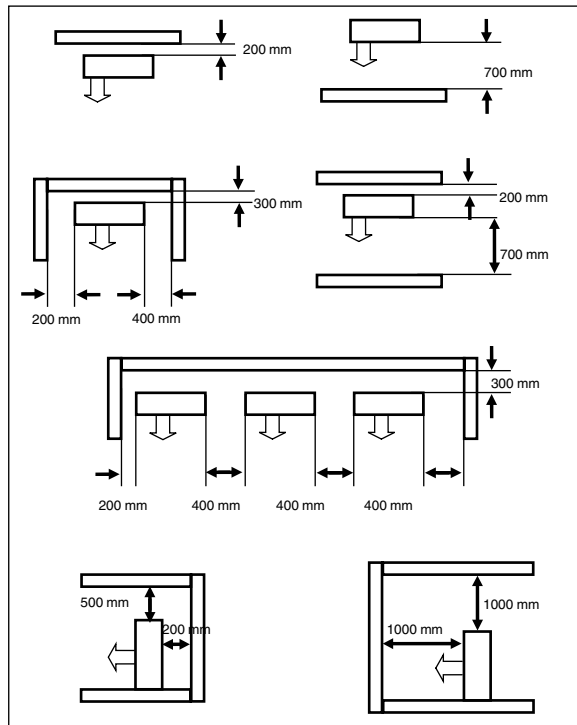
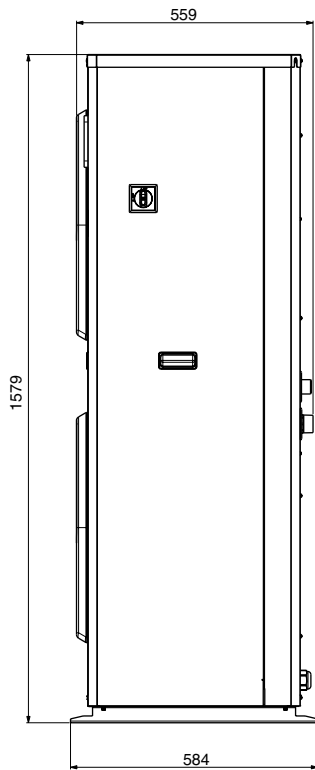
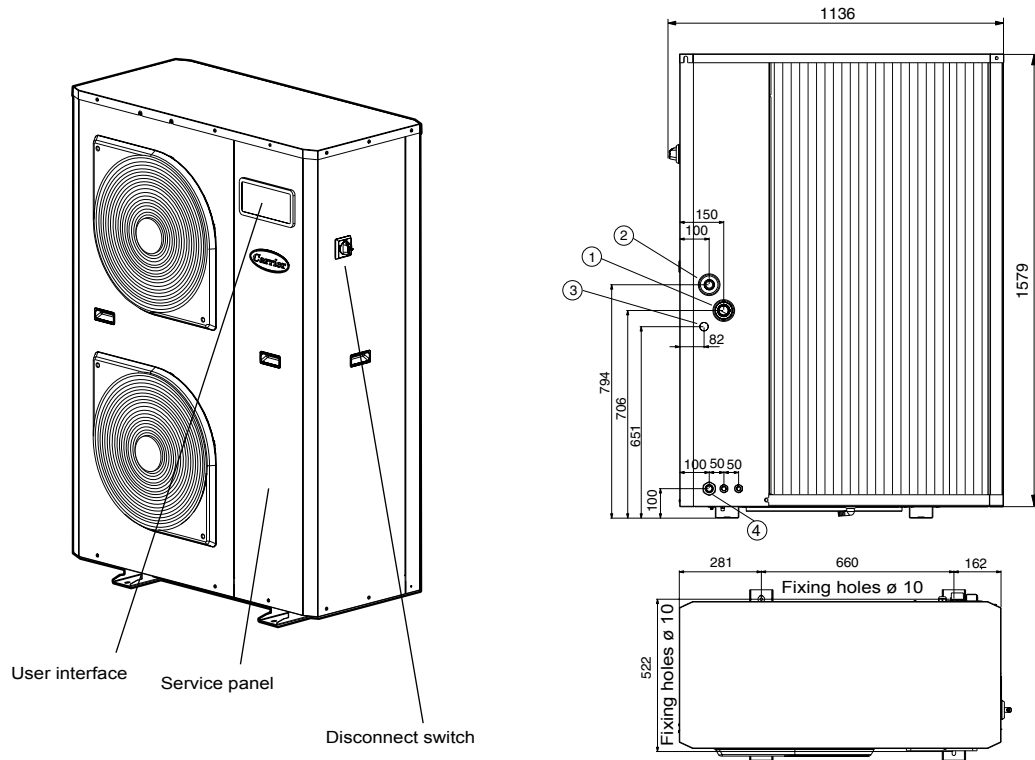
2 – Constant delta T control

The VWF algorithm maintains a constant delta T no matter what the unit load, reducing the flow rate to the minimum.

This solution can be used for systems with two-way or three-way valves and achieves higher energy savings than the “Constant unit outlet pressure control” mode. It is suitable for the majority of comfort applications.

DIMENSIONS/CLEARANCES

30RB/RQ 017-021

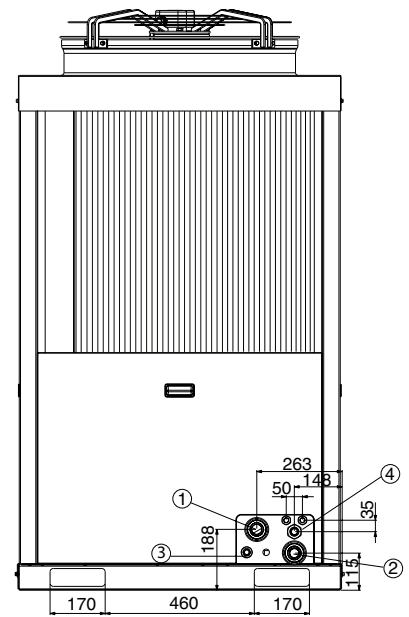
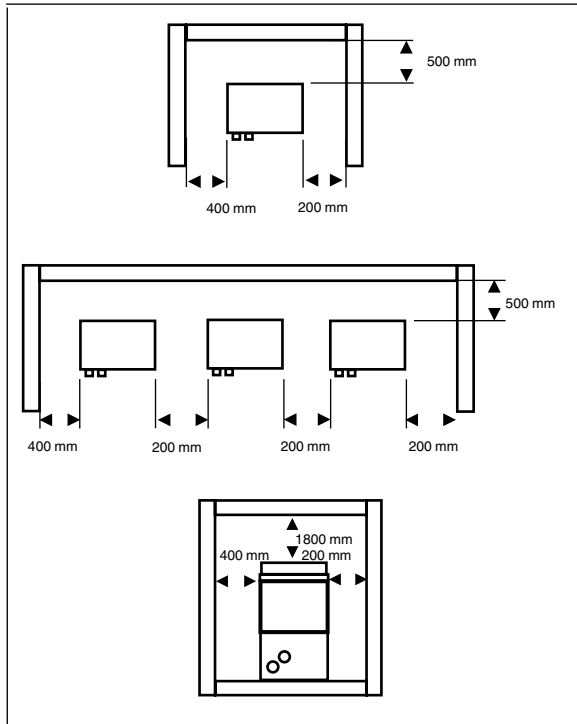
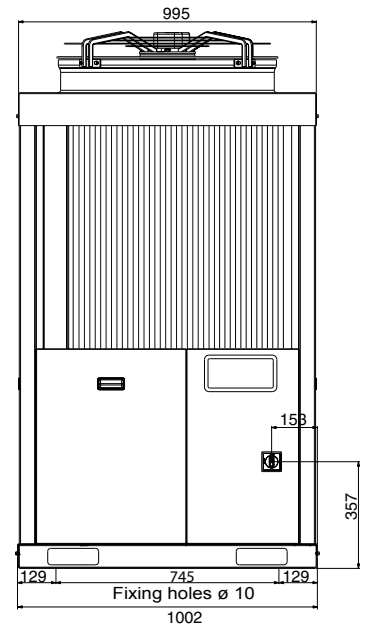
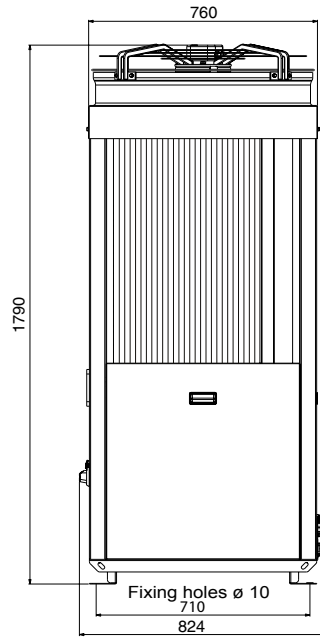
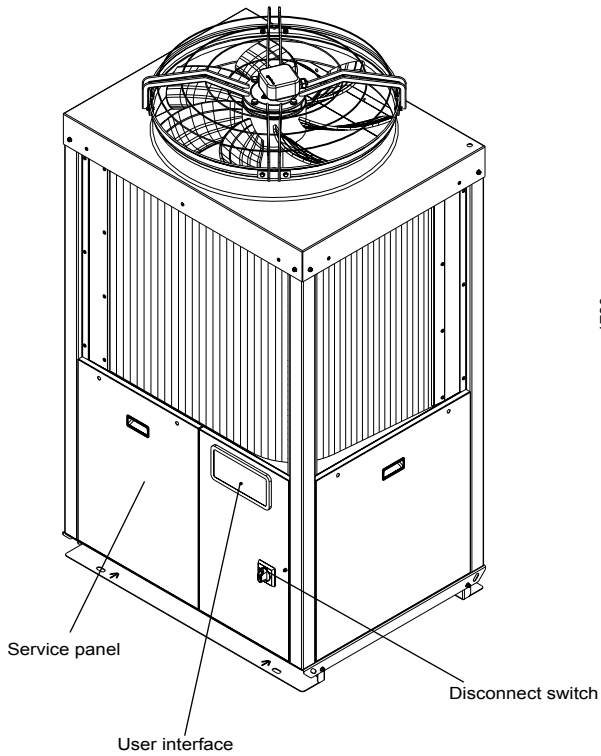


Legend

- All dimensions are in mm
1. Water inlet
 2. Water outlet
 3. Water fill kit connection (option)
 4. Power connections

DIMENSIONS/CLEARANCES

30RB/RQ 026-040



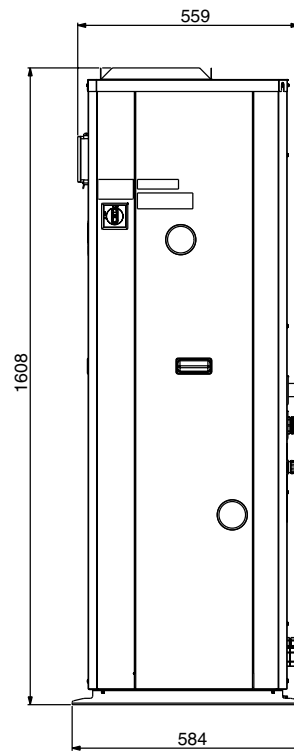
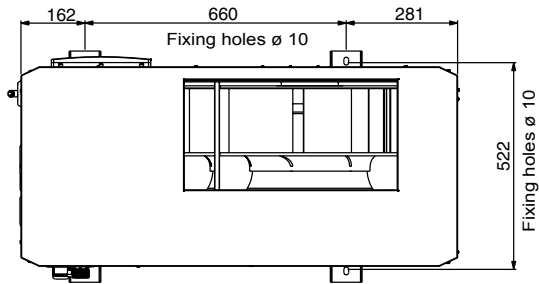
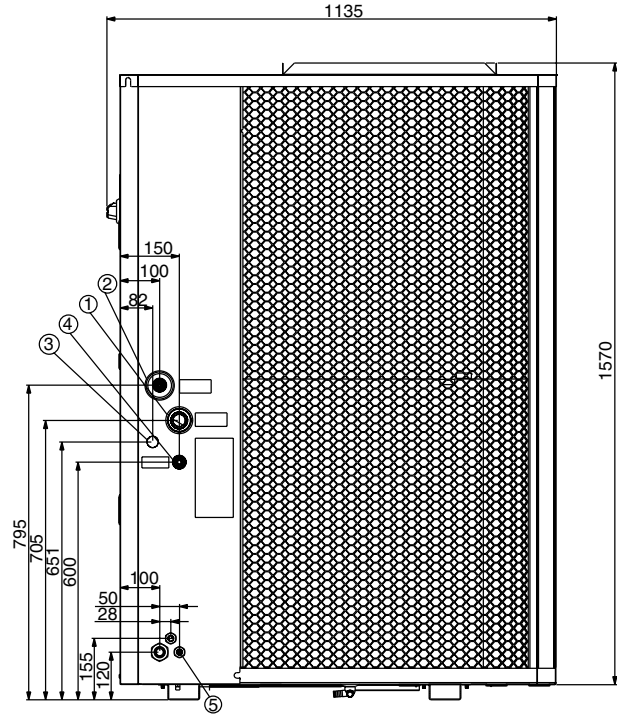
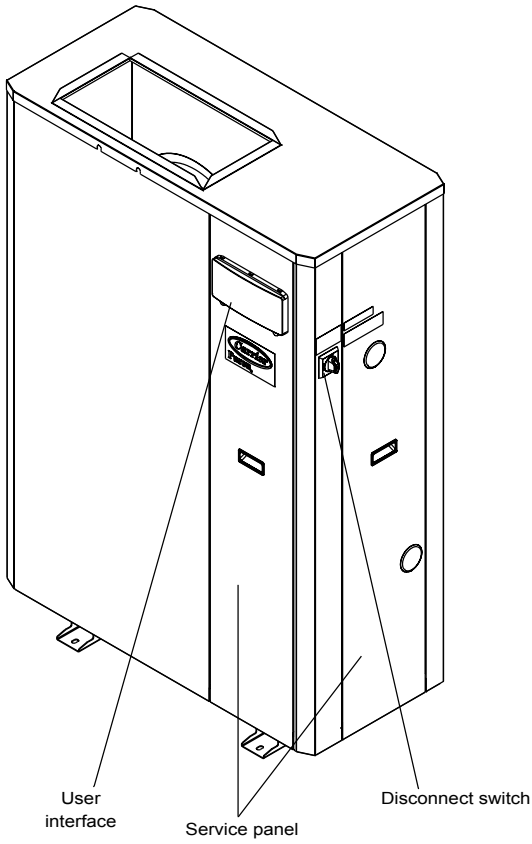
Legend

All dimensions are in mm

1. Water inlet
2. Water outlet
3. Water fill kit connection (option)
4. Power connections

DIMENSIONS/CLEARANCES

30RBY 017-021 - standard units

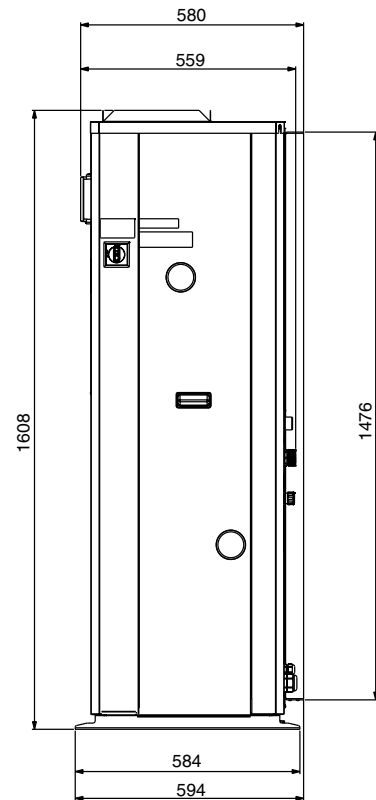
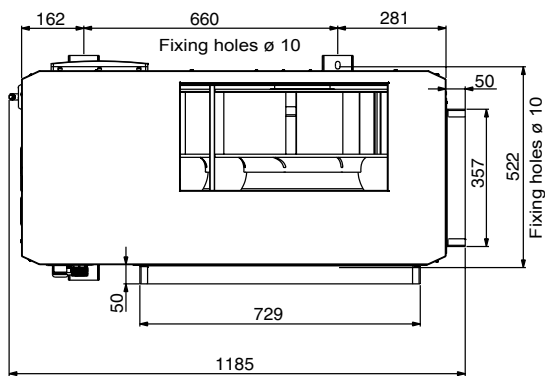
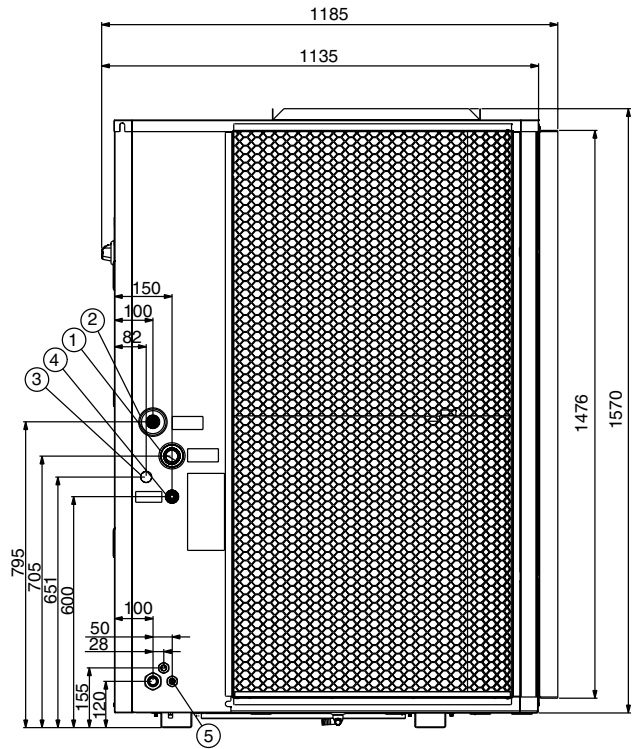
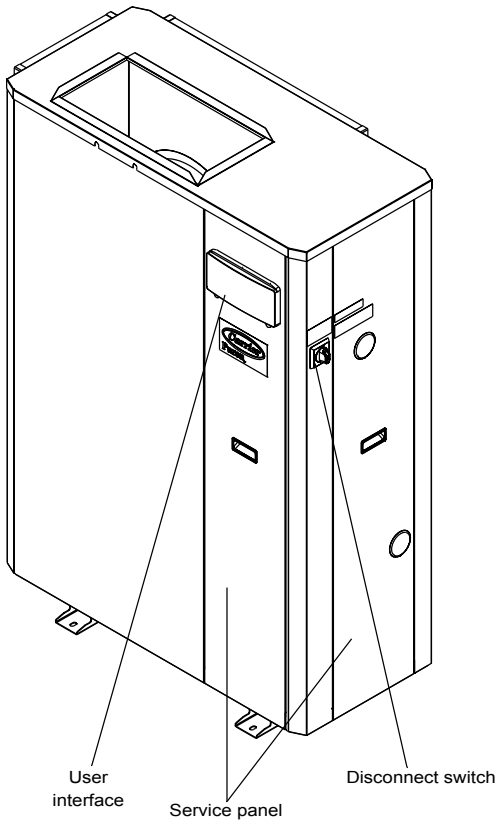


Legend

- All dimensions are in mm
1. Water inlet
 2. Water outlet
 3. Water fill kit connection (option)
 4. Relief valve
 5. Power connections

DIMENSIONS/CLEARANCES

30RBY 017-021 - units with return air ducts



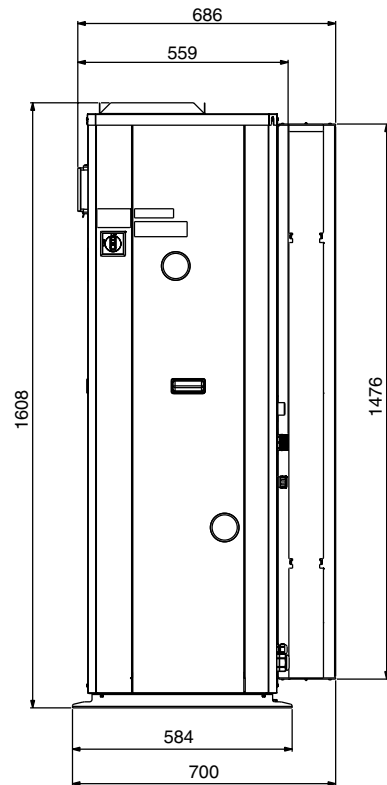
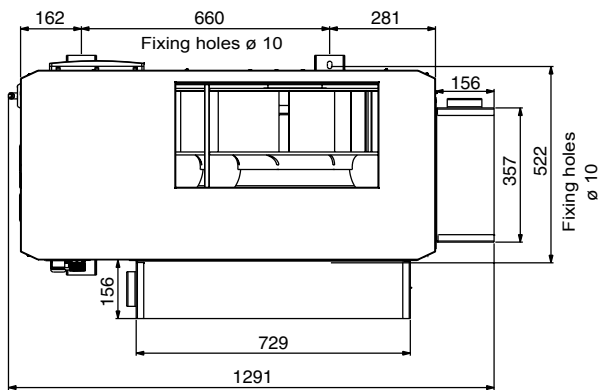
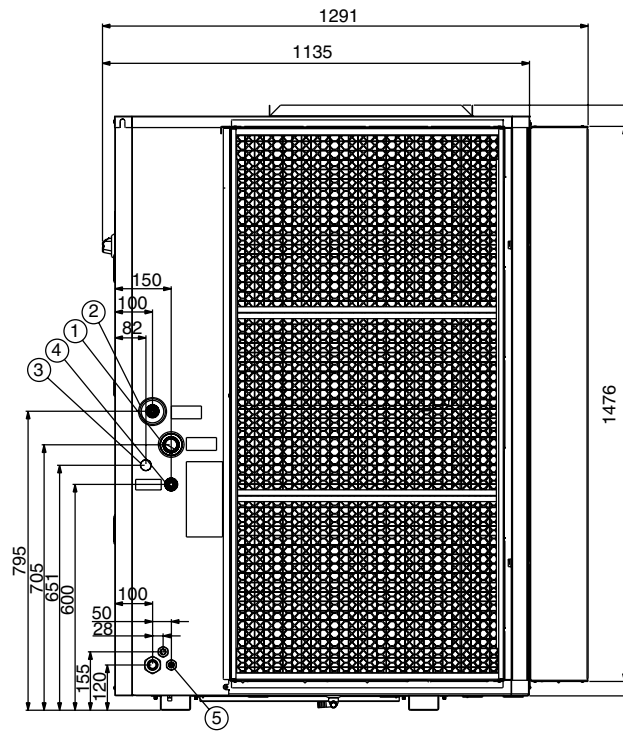
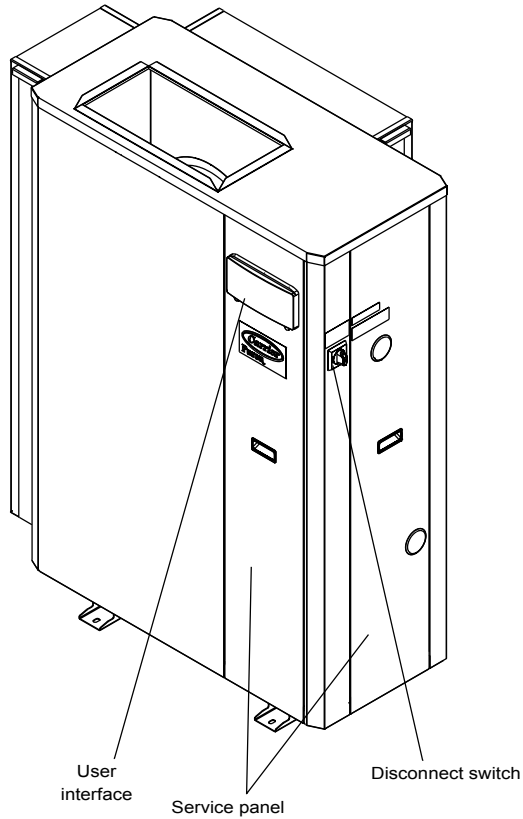
Legend

All dimensions are in mm

- 1. Water inlet
- 2. Water outlet
- 3. Water fill kit connection (option)
- 4. Relief valve
- 5. Power connections

DIMENSIONS/CLEARANCES

30RBY 017-021 - units with filter frame on the return air side



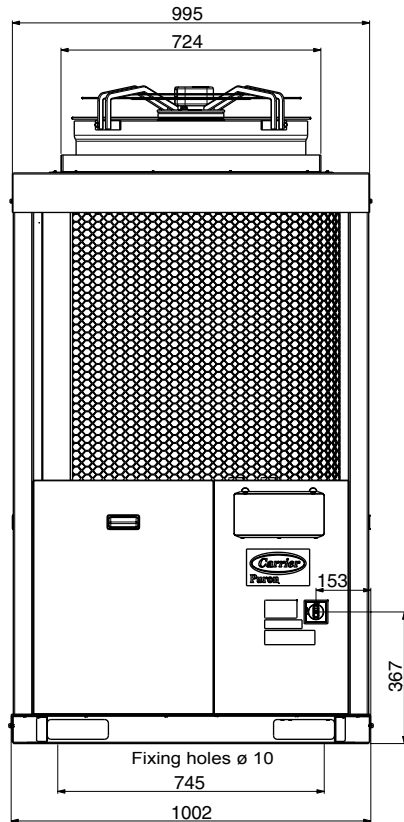
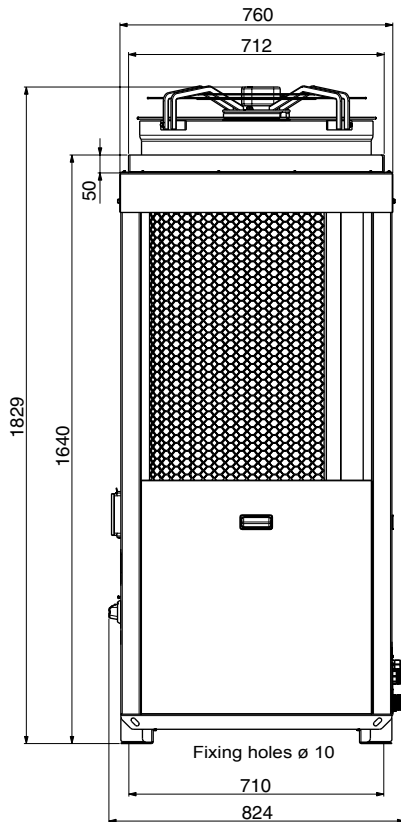
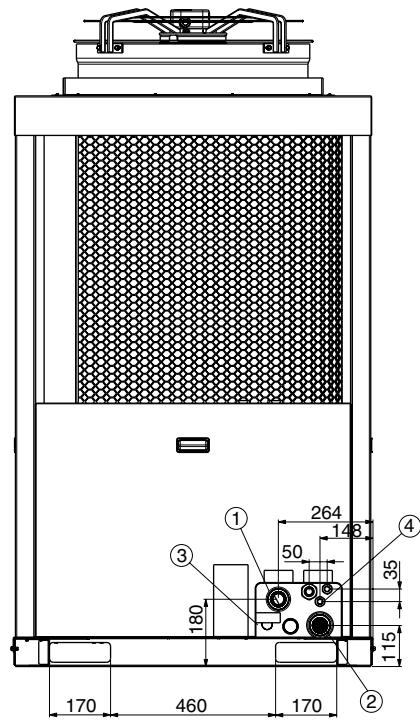
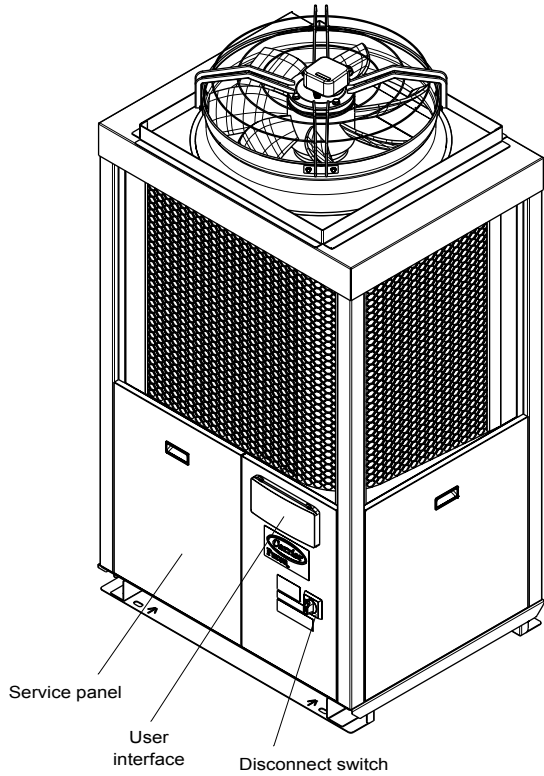
Legend

All dimensions are in mm

1. Water inlet
2. Water outlet
3. Water fill kit connection (option)
4. Relief valve
5. Power connections

DIMENSIONS/CLEARANCES

30RBY 026-033



Legend

All dimensions are in mm

- 1. Water inlet
- 2. Water outlet
- 3. Water fill kit connection (option)
- 4. Power connections

HEATING CAPACITIES IN ACCORDANCE WITH EN14511-3 : 2013

30RQ units

LWT °C	Outside air dry-bulb (wet-bulb) temperature, °C																							
	-15 (-16)				-10 (-11)				-7 (-8)				2 (1)				7 (6)				12 (11)			
	Qh kW	COP kW/kW	q l/s	Δp kPa	Qh kW	COP kW/kW	q l/s	Δp kPa	Qh kW	COP kW/kW	q l/s	Δp kPa	Qh kW	COP kW/kW	q l/s	Δp kPa	Qh kW	COP kW/kW	q l/s	Δp kPa	Qh kW	COP kW/kW	q l/s	Δp kPa
017	7,5	2,06	0,47	15	8,5	2,29	0,54	19	9,1	2,45	0,58	22	10,8	3,98	0,74	34	17,9	4,47	0,85	44	20,4	4,96	0,97	56
021	9,5	2,00	0,60	21	10,6	2,22	0,68	26	11,4	2,37	0,73	29	14,8	4,05	0,93	44	17,8	4,22	1,06	54	25,4	4,83	1,21	68
026	14,7	2,25	0,81	21	16,7	2,52	0,93	28	18,1	2,70	1,01	32	21,1	3,86	1,30	52	24,7	4,15	1,48	66	35,5	4,86	1,69	84
033	16,6	2,29	0,92	22	18,8	2,55	1,05	29	20,3	2,72	1,13	33	23,6	3,84	1,45	54	27,6	4,13	1,66	69	39,8	4,85	1,89	90
040	-	-	-	-	23,5	2,54	1,30	14	25,3	2,70	1,41	16	28,2	3,63	1,79	25	39,2	3,84	2,05	33	49,0	4,65	2,34	42
017	7,6	1,89	0,47	14	8,6	2,10	0,54	18	9,2	2,24	0,58	21	10,7	3,57	0,74	33	17,6	4,03	0,84	42	20,1	4,49	0,96	53
021	9,6	1,86	0,60	21	10,7	2,07	0,68	25	11,5	2,21	0,73	29	14,7	3,72	0,92	42	22,0	3,98	1,05	52	25,1	4,40	1,20	65
026	14,7	2,05	0,80	20	16,7	2,30	0,92	26	18,1	2,47	1,00	31	20,8	3,49	1,28	49	30,8	3,98	1,47	63	35,1	4,42	1,67	81
033	16,6	2,10	0,91	21	19,0	2,35	1,05	28	20,4	2,51	1,13	32	23,2	3,51	1,44	52	34,3	3,98	1,64	66	39,2	4,41	1,87	85
040	-	-	-	-	23,6	2,36	1,29	13	25,5	2,52	1,40	16	27,8	3,33	1,77	24	38,6	3,52	2,02	31	48,2	4,26	2,30	40
017	-	-	-	-	8,7	1,93	0,54	18	9,3	2,05	0,58	21	10,5	3,20	0,73	31	17,3	3,60	0,83	40	19,7	4,01	0,94	50
021	-	-	-	-	10,9	1,91	0,68	25	11,7	2,04	0,73	28	14,6	3,39	0,92	41	21,7	3,63	1,04	50	24,7	4,02	1,18	62
026	-	-	-	-	16,8	2,10	0,92	26	18,1	2,25	0,99	29	20,5	3,14	1,27	47	30,2	3,59	1,44	60	34,5	4,00	1,65	77
033	-	-	-	-	19,0	2,15	1,04	27	20,5	2,30	1,12	31	22,9	3,16	1,42	49	33,8	3,59	1,61	63	38,5	4,00	1,84	81
040	-	-	-	-	23,8	2,16	1,29	13	25,6	2,31	1,39	15	27,5	3,04	1,75	23	41,4	3,50	1,99	29	47,3	3,88	2,26	38
017	-	-	-	-	-	-	-	-	9,5	1,90	0,58	20	10,4	2,87	0,72	30	17,0	3,21	0,81	38	19,3	3,57	0,92	47
021	-	-	-	-	-	-	-	-	12,0	1,88	0,73	27	14,4	3,06	0,91	39	21,5	3,28	1,03	48	24,3	3,64	1,16	60
026	-	-	-	-	-	-	-	-	18,4	2,06	0,98	28	20,1	2,81	1,24	44	29,6	3,21	1,42	56	33,8	3,59	1,61	72
033	-	-	-	-	-	-	-	-	20,6	2,10	1,10	29	22,5	2,82	1,39	46	33,0	3,19	1,58	59	37,6	3,57	1,80	76
040	-	-	-	-	-	-	-	-	26,1	2,13	1,39	15	27,2	2,76	1,74	22	40,7	3,16	1,95	28	46,3	3,50	2,22	35
017	-	-	-	-	-	-	-	-	-	-	-	-	11,1	2,52	0,71	29	16,7	2,87	0,80	36	18,8	3,17	0,90	44
021	-	-	-	-	-	-	-	-	-	-	-	-	13,3	2,30	0,90	38	21,1	2,92	1,01	46	23,8	3,25	1,14	56
026	-	-	-	-	-	-	-	-	-	-	-	-	20,5	2,40	1,22	42	28,9	2,84	1,38	53	32,8	3,17	1,57	67
033	-	-	-	-	-	-	-	-	-	-	-	-	22,9	2,42	1,36	43	32,0	2,82	1,53	55	36,2	3,14	1,73	69
040	-	-	-	-	-	-	-	-	-	-	-	-	28,0	2,39	1,72	21	40,1	2,85	1,93	27	45,1	3,14	2,17	33

Legend

LWT Leaving water temperature, °C
 Qc Heating capacity, kW
 EER Coefficient of performance, kW/kW
 q Condenser water flow rate, l/s
 Δp Condenser pressure drop, kPa

Application data

Standard units, refrigerant: R-410A
 Condenser entering/leaving water temperature difference: 5K for LWT ≤ 50°C
 Condenser fluid: chilled water
 Fouling factor: 0 (m² K)/W
 Performances in accordance with EN14511-3:2013.

COOLING CAPACITIES IN ACCORDANCE WITH EN14511-3 : 2011

30RBY units

LWT °C	Condenser entering air temperature, °C																							
	20				25				30				35				40				46			
	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa
017	17.3	3.71	0.85	48	16.6	3.34	0.81	44	15.8	2.98	0.78	41	15.1	2.64	0.74	37	14.2	2.34	0.70	33	13.2	2.00	0.65	29
021	22.0	3.55	1.10	66	21.2	3.22	1.06	62	20.4	2.88	1.02	58	19.3	2.54	0.97	53	18.1	2.18	0.90	48	16.3	1.77	0.81	40
026	28.6	3.85	1.41	100	27.7	3.45	1.37	95	26.6	3.09	1.31	88	25.4	2.75	1.25	81	24.0	2.40	1.18	74	21.9	2.00	1.08	63
033	34.0	4.04	1.63	92	33.0	3.64	1.59	87	31.8	3.28	1.53	82	30.5	2.91	1.46	75	28.7	2.53	1.38	67	26.0	2.09	1.25	56
017	18.2	3.83	0.89	52	17.4	3.40	0.85	48	16.5	2.98	0.81	43	15.7	2.65	0.77	39	14.8	2.35	0.73	35	13.7	2.00	0.67	30
021	23.2	3.65	1.16	72	22.3	3.30	1.12	67	21.4	2.96	1.07	63	20.3	2.60	1.02	57	19.0	2.25	0.95	51	17.2	1.83	0.86	43
026	30.2	4.00	1.49	109	29.3	3.60	1.45	103	28.2	3.23	1.40	97	26.9	2.87	1.33	89	25.5	2.52	1.26	81	23.3	2.10	1.15	69
033	35.9	4.19	1.73	101	35.0	3.79	1.68	96	33.7	3.42	1.62	90	32.3	3.05	1.55	83	30.4	2.66	1.46	74	27.7	2.20	1.33	62
017	19.7	4.04	0.97	60	18.9	3.59	0.93	55	17.9	3.16	0.88	50	16.9	2.76	0.83	45	15.8	2.39	0.78	39	14.4	2.00	0.71	33
021	25.0	3.77	1.26	80	24.1	3.42	1.21	75	23.1	3.07	1.16	70	21.8	2.70	1.10	64	20.5	2.34	1.03	57	18.5	1.92	0.93	48
026	32.7	4.20	1.62	123	31.8	3.80	1.58	117	30.7	3.43	1.52	110	29.3	3.06	1.45	101	27.8	2.70	1.37	92	25.4	2.26	1.26	79
033	38.9	4.42	1.88	116	37.9	4.01	1.83	110	36.6	3.62	1.77	103	35.1	3.24	1.69	95	33.2	2.84	1.60	86	30.3	2.36	1.46	72
017	22.3	4.26	1.10	74	21.4	3.84	1.06	68	20.5	3.44	1.01	63	19.4	3.03	0.96	56	18.1	2.63	0.89	50	16.3	2.16	0.80	41
021	28.4	3.96	1.43	97	27.3	3.60	1.38	91	26.1	3.23	1.32	84	24.7	2.85	1.24	76	23.0	2.47	1.16	68	-	-	-	-
026	37.4	4.51	1.86	150	36.4	4.10	1.81	143	35.1	3.72	1.75	135	33.6	3.35	1.67	125	31.9	2.97	1.59	115	29.4	2.52	1.46	99
033	44.8	4.80	2.17	148	43.6	4.38	2.11	140	42.1	3.97	2.04	131	40.4	3.57	1.96	122	38.3	3.14	1.86	110	35.1	2.64	1.70	93
017	23.0	4.28	1.14	76	22.0	3.85	1.09	70	20.9	3.44	1.04	64	19.9	3.07	0.98	58	-	-	-	-	-	-	-	-
021	28.8	3.97	1.46	97	27.6	3.61	1.40	91	26.3	3.24	1.33	84	24.8	2.85	1.25	76	23.1	2.47	1.16	67	-	-	-	-
026	40.4	4.67	2.01	169	39.3	4.26	1.96	161	37.9	3.87	1.89	152	36.1	3.49	1.80	139	34.1	3.10	1.69	126	31.1	2.61	1.54	108
033	47.2	4.92	2.29	161	45.9	4.51	2.23	152	44.2	4.09	2.15	142	42.3	3.67	2.05	130	39.9	3.23	1.93	117	36.2	2.70	1.75	97

Legend

LWT Leaving water temperature, °C
 Qc Cooling capacity, kW
 EER Energy efficiency ratio, kW/kW
 q Evaporator water flow rate, l/s
 Δp Evaporator pressure drop, kPa

Application data

Standard units, refrigerant: R-410A
 Evaporator entering/leaving water temperature difference: 5 K
 Evaporator fluid: chilled water
 Fouling factor: 0.18 x 10⁻⁴ (m² K)/W
 Performances in accordance with EN14511-3:2011.



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Manufacturer reserves the right to change any product specifications without notice.

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Quality and Environment
Management Systems
Approval